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| 10/622,732 | 07/21/2003 | Sheng-Chih Wan | MR1035-1282 | 7607 |

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| EXAMINER | |
|---|---|
| LEURIG, SHARLENE L | |
| **ART UNIT** | **PAPER NUMBER** |
| 2879 | |

DATE MAILED: 05/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/622,732 | WAN ET AL. | |
| | Examiner | Art Unit | |
| | Sharlene Leurig | 2879 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *09 March 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-3 and 5-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 5-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Objections*

1. Claim 7 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 1 recites the limitation of the UV light source being a UV light tube. Claim 7, which depends on claim 1, recites the limitation of the UV light source being a UV light tube, and does not introduce any further limiting details of the claimed invention.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 recites the limitation of the UV light source being a UV light tube. Claim 8, which depends on claim 1, recites the limitation of the UV light source being a UV light-emitting diode. The UV light source cannot be both a UV light tube and a UV light-emitting diode. For the purposes of continued examination, the claim will be interpreted as meaning that the UV light source is a UV light tube.

### *Claim Rejections - 35 USC § 102*

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 17 is rejected under 35 U.S.C. 102(b) as being anticipated by Hayashi et al. (US 2002/0015297 A1).

Hayashi discloses a flat lamp structure comprising a reflecting plate (Figure 35A, element 82) having a cavity, the cavity having a bottom wall bounded by a plurality of sidewalls, at least one UV light source (81) disposed in the cavity wherein the UV light source is a UV light tube that emits UV light, and a transparent substrate (Figure 35B, element 83) forming a closure for the cavity and being coated with a fluorescent powder (86), wherein the UV light emitted by the UV light source is reflected by the reflecting plate and excites the fluorescent powder to radiate visible light that can be interpreted as being of high-brightness (paragraphs 0305-0309).

### *Claim Rejections - 35 USC § 103*

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-3, 5-8, 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hayashi et al. (US 2002/0015297 A1) in view of Zou et al. (6,550,942) (of record) and further in view of Takahashi (6,717,348).

Regarding claim 1, Hayashi discloses a flat lamp structure comprising a reflecting plate (Figure 35A, element 82) having a cavity, the cavity having a longitudinally-extending bottom wall bounded by a plurality of sidewalls, at least one UV light source (81) disposed in the cavity wherein the UV light source is a UV light tube that emits UV light, and a transparent substrate (Figure 35B, element 83) having inner and outer walls, the inner wall overlaying the reflecting plate, the transparent substrate forming a closure for the cavity and being coated with a fluorescent powder (86), wherein the UV light emitted by the UV light source is reflected by the reflecting plate and excites the fluorescent powder to radiate visible light that can be interpreted as being of high-brightness from the outer wall of the transparent substrate (paragraphs 0305-0309). Hayashi discloses the reflective plate as being formed of a reflective material such as aluminum, but discloses that a further reflective substance may be applied to the inside of the reflecting plate to increase the reflectivity (paragraph 0281). Hayashi further discloses an embodiment in which the fluorescent powder (Figure 82, element 486) on a substrate (480) opposite the UV light tube is dispersed in a binder (488) (paragraph 0458).

Hayashi fails to exemplify the reflecting plate being coated with titanium dioxide and a macromolecular polymer.

Zou teaches a variety of techniques for constructing a reflective layer (Figure 3, element 106) for a UV light source (102) coating the inside of the cavity in which the light source is provided. Zou teaches that the reflective layer may be formed of a macromolecular polymer mixed with titanium dioxide and that may be combined with a different type of reflective material such as aluminum to gain even higher reflectivity. Zou teaches this type of reflective layer as having very high reflectivity (column 5, line 56 to column 6, line 35).

Hayashi fails to exemplify a polymeric binder for fixing the phosphor particles.

Takahashi teaches a flat lamp structure having a UV (column 1, line 9) light tube (Figure 1, element 20) (column 4, line 46) with a separate substrate (70) having formed thereon a fluorescent powder (80) mixed with a macromolecular polymer resin as a binding agent. Takahashi teaches such a polymeric binder as being compatible with achieving maximum brightness (column 5, line 60 to column 6, line 12).

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the lamp disclosed by Hayashi to have the reflective plate coated with a polymer mixed with titanium dioxide in order to increase the reflectivity of the reflecting plate, as taught by Zou, and to thereby improve the efficiency of the lamp, and to further modify the lamp of Hayashi to bind the fluorescent powder particles with a macromolecular polymer such as a resin in order to agglomerate the particles while achieving maximum brightness of the lamp, as taught by Takahashi.

Regarding claim 2, Hayashi fails to exemplify the bottom wall and the plurality of sidewalls all being coated with a reflectivity-enhancing coating.

Zou teaches forming a reflective layer (106) of a macromolecular polymer and titania on the entire surface surrounding and supporting the lamp, with the exception of the section from which light is intended to be emitted (column 4, lines 55-65).

Regarding claim 2, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the flat lamp of Hayashi, which has a reflective plate including a bottom wall and a plurality of sidewalls surrounding the lamp, to have a reflective layer comprising titanium dioxide and macromolecular polymer coated on the entire surrounding structure, as taught by Zou, of the reflective plate, including the bottom wall as well as the sidewalls of the cavity, to maximize the amount of light reaching the transparent substrate.

Regarding claim 3, Hayashi discloses a reflective plate (82) capable of reflecting UV light (paragraphs 0305-0309).

Regarding claim 5, Hayashi discloses an embodiment in which the phosphor coating (Figure 29C, element 86) is formed on the inner wall of the transparent substrate (83).

Regarding claim 6, Hayashi discloses an embodiment in which the phosphor coating (Figure 35B, element 86) is formed on the outer wall of the transparent substrate (83).

Regarding claims 5 and 6, Hayashi fails to exemplify a polymeric binder for fixing the phosphor particles.

Takahashi teaches a flat lamp structure having a UV (column 1, line 9) light tube (Figure 1, element 20) (column 4, line 46) with a separate substrate (70) having formed

thereon a fluorescent powder (80) mixed with a macromolecular polymer resin as a binding agent. Takahashi teaches such a polymeric binder as being compatible with achieving maximum brightness (column 5, line 60 to column 6, line 12).

Therefore regarding claims 5 and 6, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the lamp disclosed by Hayashi to have the phosphor coating formed on the inner wall of the substrate or the outer wall of the substrate be composed of fluorescent powder and a macromolecular polymeric resin in order to agglomerate the particles while achieving maximum brightness of the lamp, as taught by Takahashi.

Regarding claims 7 and 8, Hayashi discloses the UV light source to be a UV lamp tube.

Regarding claim 14, Hayashi discloses that the transparent substrate (83) may be formed of a transparent glass such as Pyrex, which is brand name for a borosilicate glass (paragraph 0282).

Regarding claim 16, Hayashi discloses the UV light source as being a phosphor-free UV light tube emitting UV light by gas discharge (paragraph 0190; paragraphs 0205-0206).

8. Claims 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hayashi et al. (US 2002/0015297 A1) in view of Zou et al. (6,550,942) (of record) and further in view of Takahashi (6,717,348) as applied to claims 1-3, 5-8, 14 and 16 above, and further in view of Roach et al. (6,274,978) (of record).

Hayashi discloses a flat lamp structure having all the limitations discussed above in regard to claim 1.

Hayashi fails to exemplify the reflecting plate being coated with titanium dioxide and a macromolecular polymer.

Zou teaches a variety of techniques for constructing a reflective layer (Figure 3, element 106) for a UV light source (102) coating the inside of the cavity in which the light source is provided. Zou teaches that the reflective layer may be formed of a macromolecular polymer mixed with titanium dioxide and that may be combined with a different type of reflective material such as aluminum to gain even higher reflectivity. Zou teaches this type of reflective layer as having very high reflectivity (column 5, line 56 to column 6, line 35).

Hayashi fails to exemplify a polymeric binder for fixing the phosphor particles.

Takahashi teaches a flat lamp structure having a UV (column 1, line 9) light tube (Figure 1, element 20) (column 4, line 46) with a separate substrate (70) having formed thereon a fluorescent powder (80) mixed with a macromolecular polymer resin as a binding agent. Takahashi teaches such a polymeric binder as being compatible with achieving maximum brightness (column 5, line 60 to column 6, line 12).

Hayashi, Zou and Takahashi further fail to exemplify materials for transparent substrates other than borosilicate glass.

Roach teaches transparent materials for a transparent substrate (110) for a light emission structure, the materials comprising borosilicate glass, quartz glass, sodium-containing glass, or plastics such as PMMA, polycarbonate or PET (polyester) (column

9, lines 33-37). Roach therefore teaches PMMA, PC, PET, quartz glass and sodium-containing glass as equivalents to borosilicate glass.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the lamp disclosed by Hayashi to have the reflective plate coated with a polymer mixed with titanium dioxide in order to increase the reflectivity of the reflecting plate, as taught by Zou, and to thereby improve the efficiency of the lamp, and to further modify the lamp of Hayashi to bind the fluorescent powder particles with a macromolecular polymer such as a resin in order to agglomerate the particles while achieving maximum brightness of the lamp, as taught by Takahashi, and to further modify the transparent substrate of Hayashi to be made of any of the glasses or plastics taught by Roach in order to provide a transparent substrate equivalent to borosilicate glass in case of cost considerations.

9. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hayashi et al. (US 2002/0015297 A1) in view of Zou et al. (6,550,942) (of record) and further in view of Takahashi (6,717,348) as applied to claims 1-3, 5-8, 14 and 16 above, and further in view of Yang et al. (CN 1425621 A) (of record).

Hayashi discloses a flat lamp structure having all the limitations discussed above in regard to claim 1.

Hayashi fails to exemplify the reflecting plate being coated with titanium dioxide and a macromolecular polymer.

Zou teaches a variety of techniques for constructing a reflective layer (Figure 3, element 106) for a UV light source (102) coating the inside of the cavity in which the light source is provided. Zou teaches that the reflective layer may be formed of a macromolecular polymer mixed with titanium dioxide and that may be combined with a different type of reflective material such as aluminum to gain even higher reflectivity. Zou teaches this type of reflective layer as having very high reflectivity (column 5, line 56 to column 6, line 35).

Hayashi fails to exemplify a polymeric binder for fixing the phosphor particles.

Takahashi teaches a flat lamp structure having a UV (column 1, line 9) light tube (Figure 1, element 20) (column 4, line 46) with a separate substrate (70) having formed thereon a fluorescent powder (80) mixed with a macromolecular polymer resin as a binding agent. Takahashi teaches such a polymeric binder as being compatible with achieving maximum brightness (column 5, line 60 to column 6, line 12).

Hayashi, Zou and Takahashi further fail to exemplify materials for transparent substrates other than borosilicate glass.

Yang teaches a transparent glass of lead-sodium silicate that attenuates UV radiation.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the lamp disclosed by Hayashi to have the reflective plate coated with a polymer mixed with titanium dioxide in order to increase the reflectivity of the reflecting plate, as taught by Zou, and to thereby improve the efficiency of the lamp, and to further modify the lamp of Hayashi to bind the fluorescent powder

particles with a macromolecular polymer such as a resin in order to agglomerate the particles while achieving maximum brightness of the lamp, as taught by Takahashi, and to further modify the transparent substrate of Hayashi to be made of the lead-sodium silicate glass taught by Yang in order to provide a transparent substrate that attenuates UV radiation to protect viewers.

### *Response to Arguments*

10. Applicant's arguments with respect to claims 1-17 have been considered but are moot in view of the new ground(s) of rejection.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sharlene Leurig whose telephone number is (571) 272-2455. The examiner can normally be reached on Monday through Friday, 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (571) 272-2457. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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